SPRING 2013 NEWSLETTER

Hello,

This is my favorite time of the year, when everything is fresh, the plants are growing and blooming, the critters are enjoying the warming weather and all is good. Now go out and enjoy your State Parks!

Of All the Galls: the Leafy Bud Gall Wasp

by John Fulton

Based in part on information from

" Field Guide to Plant Galls of California and Other Western States,"

by Ron Russo

California Natural History Guides,

Phyllis M. Faber and Bruce M. Pavlik, general editors, UC Press, 2006

I do not remember how long ago it was that I first encountered plants with galls. I was a child walking through a forest when I saw a puff of dust from underfoot. I searched and found a couple of round brown objects that could have been the type that caused the puff of dust. The 2 looked promising. I recall being one confused little tyke when the first, a puffball (fruiting body of a mushroom), and the similar appearing second, an oak apple (hard woody gall caused by a cynipid wasp), did not react the same when stepped on; they did not have the same internal structure. Both were golf-ball-size brown spheres; the soft puffball released a cloud or "puff" of spores when stepped on; the gall did not; the oak apple gall was stronger than any puffball or even any apple that I had ever stepped on, feeling more like stepping on a golf ball rather than collapsing under foot. I trace my fascination with galls to that moment of realization that some of those spheres had something solid inside them.

What is a Gall, you might ask? Even if you don't ask, I did.

A "Gall" is defined by Ron Russo in his book on galls as, "An abnormal plant growth, swelling, or tumor induced by another organism, including fruit and buds (of the host plant) altered or aborted by gall organisms. " I think of a gall as a chemically or physically induced communication between two very different organisms that results in an exchange of nutrients

from the host to the inducer. The Random House Dictionary has additional meanings for "gall" such as bile, something bitter, chaffing, resentment, and for the exchange of material between 2 dissimilar metal parts.

Plant Galls are common in the San Joaquin Valley on native plants. They indicate a long period of co-evolution between the plant hosts and the many different organisms. Most of these gall-inducers are only found on a single host plant species. The inducer and the host must co-evolve if the induce is to have any chance of completing the cycle of life.

In the spring of 2012 as leaves began to open with the warming weather, I observed the tips of a young oak erupting with new growth. I realized that some of the branch tips had different structures and thought that this may be the first year that this young oak would produce flowers that may become the first acorn crop from this particular tree, a tree about 12 years old and about 8 inches in diameter at breast height. I was wrong. It was not flowers but galls that caused the second different appearing branch tips. This Valley Oak (*Quercus lobata*) in prior years had shown high numbers of galls on the underside of leaves. Typically the galls on the leaves were of two distinct types. The first, pink stars, the size (10 mm) and shape (spiney) of the seeds of puncture vine, are caused by the Spined Turban Gall Wasp (*Antron douglasii*). The second common gall shape was like an apothecary's pestle; the underside of a single leaf may have more than a dozen of these 3 mm diameter by 10 mm high galls, caused by *Andricus kingi*, the Red Cone Gall Wasp, a Cynipid wasp.

The adult of the Leafy Bud Gall Wasp (*Andricus foliatus*), another Cynipid wasp deposits its single egg in the tissues of the Valley Oak (*Quercus lobata*). The oak responds by creating what looks like a 10-25 mm long tuft of linear projections. At first I thought they were pointed leaf-bud scales or flower buds. But they do not look like they belong to oak; they look more like they are terminal buds of some type of fir tree or other gymnosperm. Careful dissection revealed that each of these gall-structures contained a single Cynipid wasp that was less than 2 mm in length.

The process of gall formation amazes me. One organism tells another to build a structure. The construction directions have to be in a language the host will understand. This exchange of chemical communication that builds a bizarre brood chamber happens while a tiny 2mm wasp places its ovipositor between plant cells to lay an egg within the plant's tissues. The wasp injects the egg without rupturing the cells of the host plant. The egg then releases the chemicals that convince the plant to build the structure that will protect the developing larva as it grows and matures. Some of these galls are eaten by insects, a type of herbivory that characterizes inquilines. Some of the gall inducing organisms as well as some of the inquilines are subject to parasitism. And some of parasites are in turn parasitized by hyperparasites. It is amazing that there can be such a complex food web totally within that small gall on the bottom of a leaf or the tip of a branch bud.

By the 1970's I had learned in college that insects could fool plants into growing special tissues that would feed the insects during larval development. These special plant tissues are called galls. Galls are found in many plant groups and many are caused by tiny wasps of several types.

Valley Oaks and Coyote Bush (*Baccharis piluris*) are both local native plant species that often have large numbers of galls on them. If you are interested in seeing the organisms that cause them you can clip off the galls and place them into a closed glass container until the adult insects emerge. The adults do not usually eat and only live for a week or so. Good luck and enjoy the discovery of the elaborate ecology that connects so many different native species to each other.

Editors note: I also have also been fascinated by plant galls and the little insects that cause them. I have added a few photos of some of our local galls which you can easily find if you just take the time to look. Have fun! --David Milam

Cluster Gall on Blue Oak

Disc Gall on Valley Oak

Saucer Gall on Blue Oak

Jumping Gall on Blue Oak

Plate Gall on Valley Oak

Red Cone Gall on Valley Oak

Stem Gall on Blue Oak



Three views of our last mystery item were the pharyngeal teeth of the European Carp. If you looked inside the carp's mouth you would see no teeth. These pharyngeal bones and teeth are found within the back portion of the carp's throat. They assist the fish in "chewing" it's food. I found this one on North Beach at San Luis Creek on the Forebay. If you have tropical fish you may be familiar with the term "toothcarp" in reference to many of the tropical freshwater fish you can purchase for your aquarium. Now you know where the term "toothcarp" comes from.

Our next Mystery Item is this

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C.A.S.T. for Kids took place Oct 27, 2012 at the O'Neill Forebay and was a big success. There were many volunteers who took the kids and adults out on their boats to try to catch some fish. After fishing everybody was treated to a free BBQ lunch. Each kid got to take home a free fishing pole and tackle box. The smiles on all the kid's faces made every volunteer glad to be there.

Upcoming Springtime Events:

Path of the Padres Hikes: These popular hikes will be on some Fridays and most Saturdays and Sundays beginning March 2nd and will continuing through April 28th. The hike begins at the Los Banos Creek Reservoir boat launch ramp at 8 a.m. and returns to the ramp about 3:30 p.m. A pontoon boat carries passengers for about 30-40 minutes to the west end of the reservoir. The group leaves the boat at the west end of the reservoir for a five mile round-trip hike. The hike is moderately strenuous and will take about 5 hours. Participants must be in good physical condition. Sturdy footwear and layered clothing are a must. Footwear may get wet if the creek is crossed. A good hat and sunscreen are recommended. Hikers should carry a lunch and a minimum of 2 quarts of water (more if a hot day). Throughout the hike the natural and historic features of the area are pointed out and discussed by the hike leader. The hikes require reservations which can be made by calling 209-826-1197 Monday through Wednesday from 9 a.m. until 4 p.m. A reservation fee of $12.00 per person over 12 years old and $7.00 per child age 6-12 is required to confirm the telephone reservations. A family of 5 may reserve space for 2 adults and 3 children for $30.00. Space is limited. On the day of the hike visitors must pay the State Park day-use parking fee of $10.00 per car upon entry.

Pacheco State Park Wildflower Day: This fun annual one day event will be April 6th from 9:30 a.m. until 1:30 p.m. A guided birdwatchers hike begins at 9:30 a.m. At 10 a.m. there will be a naturalist led 2 mile hike that will be discussing the numerous wildflowers seen during the hike as well as historical information of the area. There will also be information tables set up by California State Parks, Four Rivers Association, Audubon Society, Department of Water Resources, as well as other fun, kid friendly activities. A day-use parking fee of $5.00 per car is required upon entry. Call 209-826-1197 Monday through Friday from 9 a.m. until 4 p.m. for further information.

Pacheco State Park Nature Hikes: During this 2 mile trail loop hike participants will learn about many of our native plants. The hikes will be naturalist led and take place from 10 a.m. to 12 noon on Saturdays and Sundays from April 7 until April 28. Just show up at the Pacheco State Park parking area, pay the parking fee and be ready to have an enjoyable morning hike. At the end of the hike you can choose to have a picnic lunch at the park's shaded tables. A day-use

parking fee of $5.00 per car is required upon entry. Call 209-826-1197 Monday through Friday from 9 a.m. until 4 p.m. for further information.

Retired Ranger David Milam will be guiding longer hikes on Saturday, April 13th, 20th & 27th. They will be moderately strenuous to strenuous, would begin at 9 a.m. and last from 4 to 7 hours. Participants must be in good physical condition. Sturdy footwear and layered clothing are a must. A good hat and sunscreen are recommended. Hikers should carry a lunch and a minimum of 2 quarts of water (more if a hot day). Just show up at the Pacheco State Park parking area, pay the parking fee and be ready to have an enjoyable morning hike. A day-use parking fee of $5.00 per car is required upon entry. Please call 826-1197 Monday through Friday from 9 a.m. until 4 p.m. for further information.

Pacheco State Park Family Kite Day: This annual family friendly day will be on Saturday, June 15th this year. Bring your own kites to fly or make or purchase a kite at the event. There will also be information tables set up by different groups, face painting, a kite hospital for any "injured" kites, a bubble-blowing contest, a pie-eating contest, and a hot dog stand may be available to purchase a quick lunch. A day-use parking fee of $5.00 per car is required upon entry. Call 209-826-1197 Monday through Friday from 9 a.m. until 4 p.m. for further information.

San Luis Reservoir Kid's Fishing and Fun Day: Mark Saturday May 18th on your calendars for this fun day. The event runs from 8 a.m. until noon at San Luis Creek North Beach Area on the O'Neill Forebay and is open for kids up to 16 years old. Other fun activities taking place during the event have been free boat rides around the Forebay (weather permitting) and an electronic "fish catching" experience. A day-use parking fee of $10.00 per car is required upon entry. For further information call 209-827-5353 from 9 a.m. until 4 p.m.

Arena Plains Vernal Pools, Wildflowers, and Wildlife Annual Tour: The biologist led springtime tour begins at 9 a.m. and last approximately 2-3 hours, consisting of caravanning in attendees' personal vehicles into the interior of the US Fish and

Wildlife's Arena Plains Unit and walking out to the vernal pools on firm, but slightly uneven terrain. The tour is a mixture of driving and walking to look at the vernal pools and fabulous displays of wildflowers; however, participants who do not wish to walk can remain in their vehicles and participate only in the driving portions. Participants should wear sturdy footwear such as hiking boots.
Directions: the meeting place will be on the south side of Hwy 140 approximately 6.5 miles east of Hwy 165 and 7 miles west of Applegate Road. The meeting location does not have a street address—it is a small sandy road with a sign marked "Snobird Lane". Turn south onto the sandy road and continue for a couple hundred yards to the meeting place at the refuge gate. Please note to be on the lookout for the "Snobird Lane" sign as it is a very small side road and could be easily missed. Please call 209-826-3508 for further information on the exact date and time (date to be determined later depending upon rainfall amounts and peak wildflowers blooming). The tour is free but you must be on time or you will find the entry gate locked and everybody gone on the tour!

Recent Director's Meeting happenings;

1. Madeline Yancey, David Batcho and David Milam were re-elected as Directors for two-year terms
2. FRA Officers for 2013 will remain the same as those for 2012; Madeline Yancey-President, John Fulton-Vice President, David Batcho-Treasurer, David Milam-Secretary
3. The FRA and DPR have signed a new Standard Agreement.
4. Supervising Ranger Denis Poole, the Park Liaison, announced he would be retiring at the end of January 2013. Superintendent Bill Lutton will be the Park Liaison for now.

Your Newsletter Editor—David Milam